Sachiko KUROSAWA*: **Notes on chromosome numbers of Spermatophytes (1)**

黒沢幸子*：種子植物染色体数ノート (1)

(Pl. VII)

This series of papers deals with the results of my studies on the chromosomes of flowering plants. The plants studied were collected from natural habitats and mostly cultivated in Tokyo or Karuizawa. The methods used in this paper are almost the same as explained in detail in my paper, 'Cytological studies on some Eastern Himalayan plants' in Hara, Flora of Eastern Himalaya pp. 658-659 (1966).

The author wishes to express her cordial thanks to Prof. Emeritus Hiroshi Hara for his continuous encouragement and valuable advice, and to Associate Prof. Hiroyoshi Ohashi for his kind help.

1) **Ranunculus Franchetii** Boissieu $2n=16$ (Pl. VII, Fig. a).

Ranunculus Franchetii is distributed in Amur, Ussuri, N. China, Korea, Saghalin, and Hokkaido, and among early-flowering perennial species in Japan, it is easily recognized in having minutely hairy subglobose achenes. The species collected at Tsukigata, Prov. Ishikari of Hokkaido was studied cytologically. It is a diploid with a basic number 8, and the karyotype is expressed as follows:

$$2n=16=6A^{m}+8B^{st}+2C^{st}.$$

The same chromosome number was found by Sokolovskaya (1966) for *R. ussuriensis* Komarov from Ussuri. The latter name is now generally considered as a synonym of *R. Franchetii*.

エゾキンポウゲ　春，北海道の湿った原野をかざる種で，痩果はまるくふくらみ細毛があるのですぐ分かる。ウスリーから同一種と思われるものについて報告があるが，日本の材料では初めての記録である。

2) **Chrysosplenium japonicum** (Maxim.) Makino $2n=24$ (Fig. 1 a).

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This species belongs to the series Alternifolia (Hara, 1957), and is a common one on the lowland of Japan, Korea, and North China. All species of this series form a polyploid series with a basic number 6 so far as hitherto known. The plants collected at Nachi, Pref. Wakayama and Mt. Kiyozumi, Pref. Chiba were a tetraploid with a basic number 6. It is interesting that this number is the same as that of *C. tetrandrum* (Lund) Th. Fries and *C. Wrightii* Franch. et Sav. of arctic regions, and *C. japonicum* lacks stolons and is bulbiferous at the caudex.

ヤマネコノメソウ　互生葉をもつこの類は世界的に見て基本数6の倍数性を示していて，北米産では高倍数体が知られている。日本のヤマネコノメソウはストロンを出さず根元にむかごをつける点で注目されるが，4倍体である。

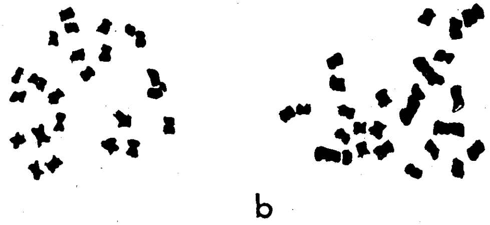


Fig. 1. Somatic chromosomes. a. *Chrysosplenium japonicum.* ×1200. b. *Chrysosplenium ramosum.* ×1200.

3) **Chrysosplenium ramosum** Maxim. 2n=24 (Fig. 1 b).

This species is distributed in Amur, Ussuri, N. China, Korea, and N. & C. Japan, and is morphologically allied to *C. americanum* Schweinitz of temperate E. N. America and *C. oppositifolium* L. of temperate W. & C. Europe in the group Oppositifolia.

The somatic chromosomes of *C. ramosum* collected at Karikomi, Nikko of C. Honshu are 24 with a basic number 6, while those of *C. oppositifolium* are 42 with a basic number 7.

マルバネコノメソウ　アムール，北支，朝鮮から日本中部に広く分布していて変化が多い。日光産で染色体数は 2n=24 であり，形態的に近いヨーロッパ産の *C. oppositifolium* が 42 であるのと対比して面白い。

4) **Toricellia tiliifolia** DC. 2n=24 (Pl. VII, Fig. d & Fig. 2 a).

The genus *Toricellia* including 3 species in Himalaya and W. China has been formerly placed in the family Cornaceae, but is different in several important morphological characters from typical genera of Cornaceae, so in recent years it is often treated as an independent family Toricelliaceae.

Toricellia tiliifolia, the type species of the genus, grown from seeds collected at Trisuli Khola of C. Nepul, was cytologically examined, and this is the first report on chromosomes of this interesting genus. The somatic chromosome number is 24, and the basic number can be considered as 6 or 12. In the family Cornaceae, the basic chromosome numbers hitherto established are 11, 9 and 8, and 6 or 12 has not been reported for Cornaceae. So, also from this point of view, *Toricellia* is different from other typical genera of Cornaceae.

本属はヒマラヤから中国にかけて3種をふくみ，従来はミズキ科に入れられていたが，ミズキ科の他属とかなり異なることが明らかになり，近年独立の科にする意見が多くなってきた。今回ネパール産で 2n=24 の染色体が初めて観察されたが，この点でも他のミズキ科の属と異なっていることは注目に価する。

5) **Hypocaeris** (§Achyrophorus) **crepidioides** (Miyabe et Kudo) Tatewaki et Kitamura $2n=10$ (Pl. VII, Fig. b).

This species is the only representative of the genus (Compositae) in Japan, and is restricted to the serpentine area on Mt. Apoi of Hokkaido where is famous for its rich flora including many palaeo-endemics. *H. crepidioides* is a diploid with a basic number 5, and its karyotype is expressed as follows:

$$2n=10=2A^{sm}+6B^{sm}+2C^{sm}.$$

Hypocaeris crepidioides is related to *H. maculata* L. of Europe and Siberia, *H. uniflora* Vill. of the Carpathians, and *H. ciliata* (Thunb.) Makino of E. Siberia, N. China and Korea. The same chromosome number $2n=10$ has been known for all these three species (Löve, A. & D. 1944; Stebbins et al. 1953).

エゾコウゾリナ　日高アポイ山の特産で日本におけるこの属の唯一の代表種である。染色体数は 2n=10 で，核型も他の近似種と同じである。

6) **Arisaema costatum** (Wall.) Martius $2n=20$ (Fig. 2 b).

In the genus *Arisaema* (Araceae), more than 50 species have hitherto been cytologically examined, and most of them have 28 somatic chromosomes, and the primary basic number is considered to be 7. The lowest number hitherto recorded in the genus is $2n=24$ for *A. tortuosum* (Wall.) Schott of Himalaya and *A. cuspidatum* (Roxb.) Engl. of NE. India, Thai-

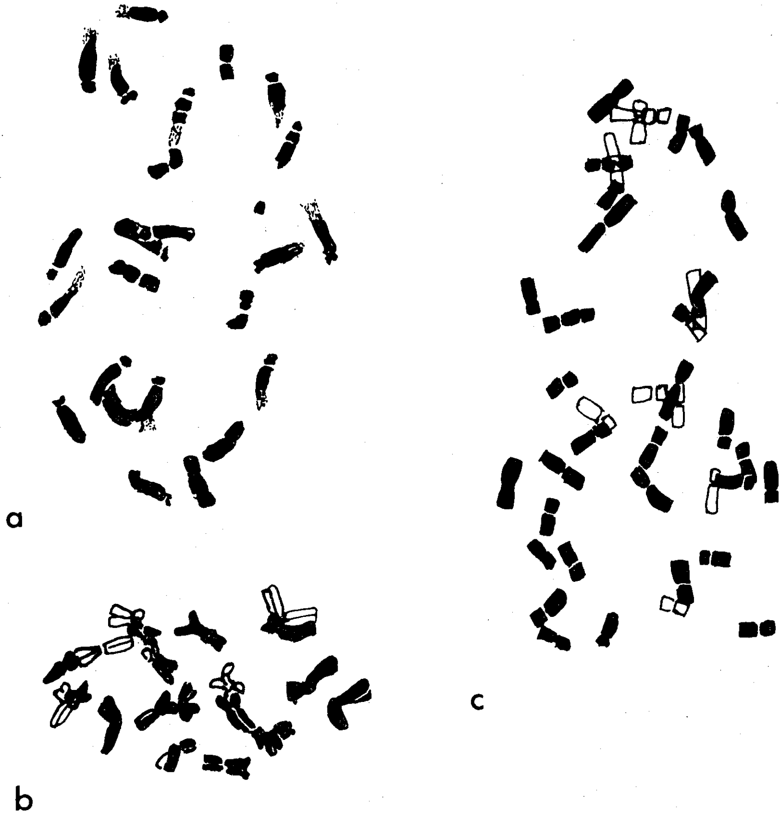


Fig. 2. Somatic chromosomes. a. *Toricellia tiliifolia.* ×1800. b. *Arisaema costatum.* ×1500. c. *Theropogon pallidus.* ×1800.

land and Malay (Hara 1971; Larsen 1969), but for *A. tortuosum* 2n=26 and 28 are also reported.

Arisaema costatum collected on Mt. Shiopuri near Kathmandu of C. Nepal was here proved to have 20 somatic chromosomes. It is remarkable that this number is the lowest chromosome number found in the genus, and also its basic number seems to be 5. This species is unique in the genus in having numerous close parallel lateral veins of leaves and 2n=20 chromosomes, and is a very interesting one in considering speciation in the genus. 本種は葉に多数の密に平行した側脈をもっている点で著しいネパール特産種で，染

色体数は 2n=20 であることが分かった。この数は本属でこれまでに報告された最小の数である。

7) **Allium splendens** Willd. ex J. A. et J. H. Schultes 2n=32.

The species is distributed in Siberia, N. Korea, Hokkaido and C. Honshu. The specimen collected at Minehama, Prov. Kitami of Hokkaido was a tetraploid with a basic number 8. The same number has been found by Sakai (1934) for specimens from the botanic garden at Sapporo, and Sokolovoskaya (1960) from Saghalin.

北見峯浜の海岸草地に生ずるミヤマラッキョウについて 2n=32 の染色体を確認した。日本産の自生品では最初の報告である。

8) **Theropogon pallidus** (Wall. ex Knuth) Maxim. 2n=40 (Pl. VII, Fig. c & Fig. 2 c).

The monotypic genus *Theropogon* (Liliaceae) of Himalaya and S. Tibet resembles genera of Trib. Ophiopogoneae in general appearance, but is generally placed in Trib. Convallarieae including *Convallaria*, *Reineckea* and *Speirantha*.

The plants collected at Dunche in Gossainkund District of C. Nepal were cytologically examined, and have 2n=40 chromosomes. The present study gives the chromosome number for the first time for this genus.

この属は一見ヤブラン属によく似ているが，液果をつけスズラン属に近いとされている。ネパール産について 2n=40 の染色体を観察したが，本属の最初の報告である。

Table 1. Chromosome numbers

Species	2n	Origin
Ranunculus Franchetii	16	Hokkaido: Tsukigata, Ishikari
Chrysosplenium japonicum	24	Honshu: Nachi, Wakayama & Mt. Kiyozumi, Chiba
Chrysosplenium ramosum	24	Honshu: Karikomi, Nikko
Toricellia tiliifolia	24	C. Nepal: Trisuli Khola
Hypocaeris crepidioides	10	Hokkaido: Mt. Apoi, Hidaka
Arisaema costatum	20	C. Nepal: Mt. Shiopuri, Kathmandu
Allium splendens	32	Hokkaido: Minehama, Kitami
Theropogon pallidus	40	C. Nepal: Dunche, Gossainkund

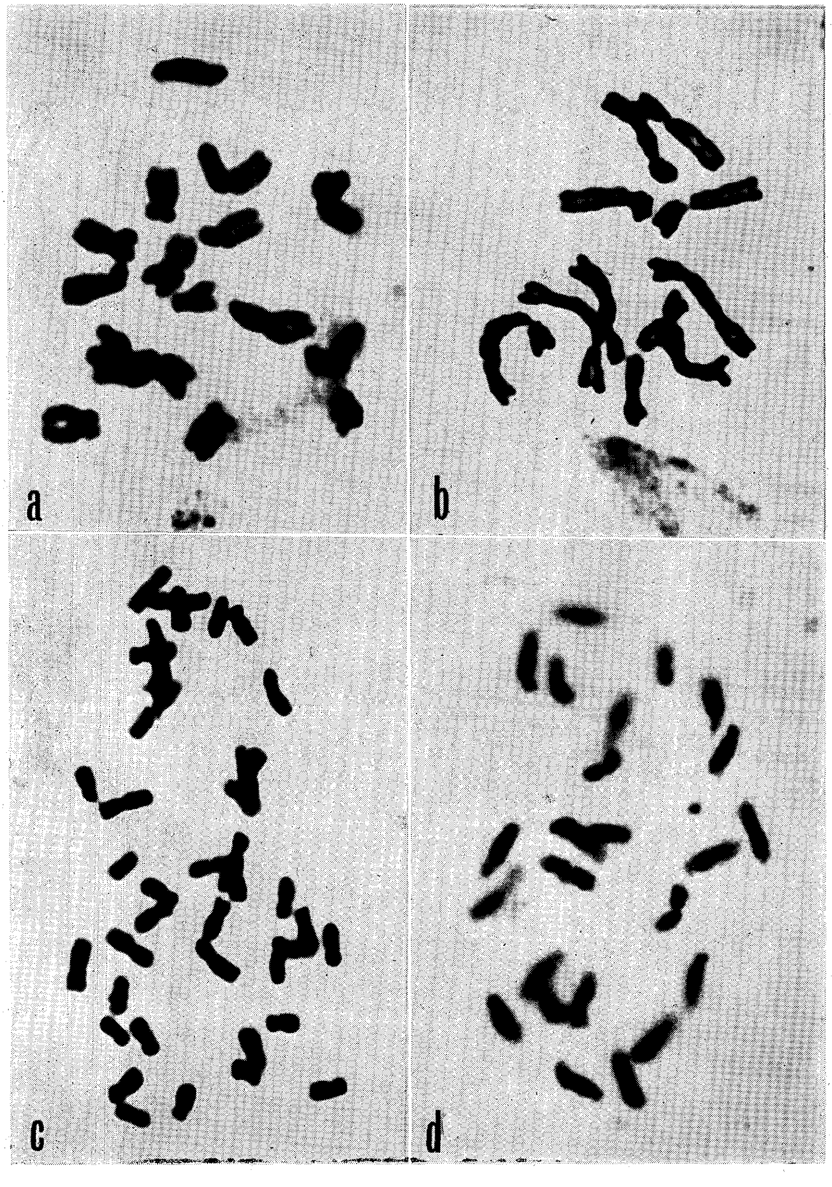
Literature cited

Fedorov, A. (ed.) 1969. Chromosome numbers of flowering plants. 1-962. Hara, H. 1957. Synopsis of the genus *Chrysosplenium* L. Journ. Fac. Sci. Univ. Tokyo Bot. **7**(1): 1-90, f. 1-17, t. 1, 2. —— 1971. A revision of the Eastern Himalayan species of the genus *Arisaema*. Hara, Fl. E. Himal. **2**: 321-354, f. 50-56. t. 15-20. Larsen, K. 1969. Studies in the flora of Thailand 52. Dansk Bot. Ark. **27**: 39-59. Löve, A. & D. Löve 1944. Cyto-taxonomical studies on boreal plants III. Arkiv för Bot. **31A** (12): 1-22. Sakai, K. 1934. Studies on the chromosome number in alpine plants I. Jap. Journ. Genet. **9** (4): 226-230. Sokolovskaya, A. P. 1960. Geografisheskoe Rasprostranenie Poliploidnykh vidov Rasteniy. Vestnik Leningr. Univ. Biol. **4** (21): 42-58. —— 1966. Geografisheskoe Rasprostranenie Poliploidnykh vidov Rasteniy. Vestnik Leningr. Univ. Biol. **1** (3): 92-106. Stebbins G. L. et al. 1953. Chromosomes and phylogeny in the Compositae, Tribe Cichorieae. Univ. Calif. Publ. Bot. **26** (6): 401-430.

Explanation of Plate VII.

Microphotographs of somatic chromosomes. a. *Ranunculus Franchetii*. 2n=16. ×1600. b. *Hypocaeris crepidioides*. 2n=10. ×1400. c. *Theropogon pallidus*. 2n=40. ×1800. d. *Toricellia tiliifolia*. 2n=24. ×1800.

□ 三好保徳： **木の実・草の実**　グリーンブックス 25，ニューサイエンス社，東京 pp. 160，¥ 900 (1977, III)。「植物と自然」の誌上に載せたものの再録で，各頁に1種づつ計150種が扱われている。主に果実についてだが，細かな果期や成長の変化，それに付随した四方の風景風物も書き添えられて，その文章を和やかにしている。まえがきによると，大戦中に右手を負傷して指を失われ，それから左手に筆を持ちかえたとあるが，じつに鋭どい観察がよくその描写を助けていて，相俟って，たとえばツブラジイやナツハゼの図のように何ともいえぬ味さえ見せている。ことにカシ属とナラ属とはかなり相違があるように思われるが，カシ中でアラカシとイチイガシはその年の秋に稔り，逆にナラ属ではウバメガシは勿論，クヌギとアベマキが次年に稔るなど，細かなしかし重要な相違に注目している。またトウゴマの刺やオジギソウの開花のように細かいが重要な記述があって楽しく且つは有益である。　（前川文夫）



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